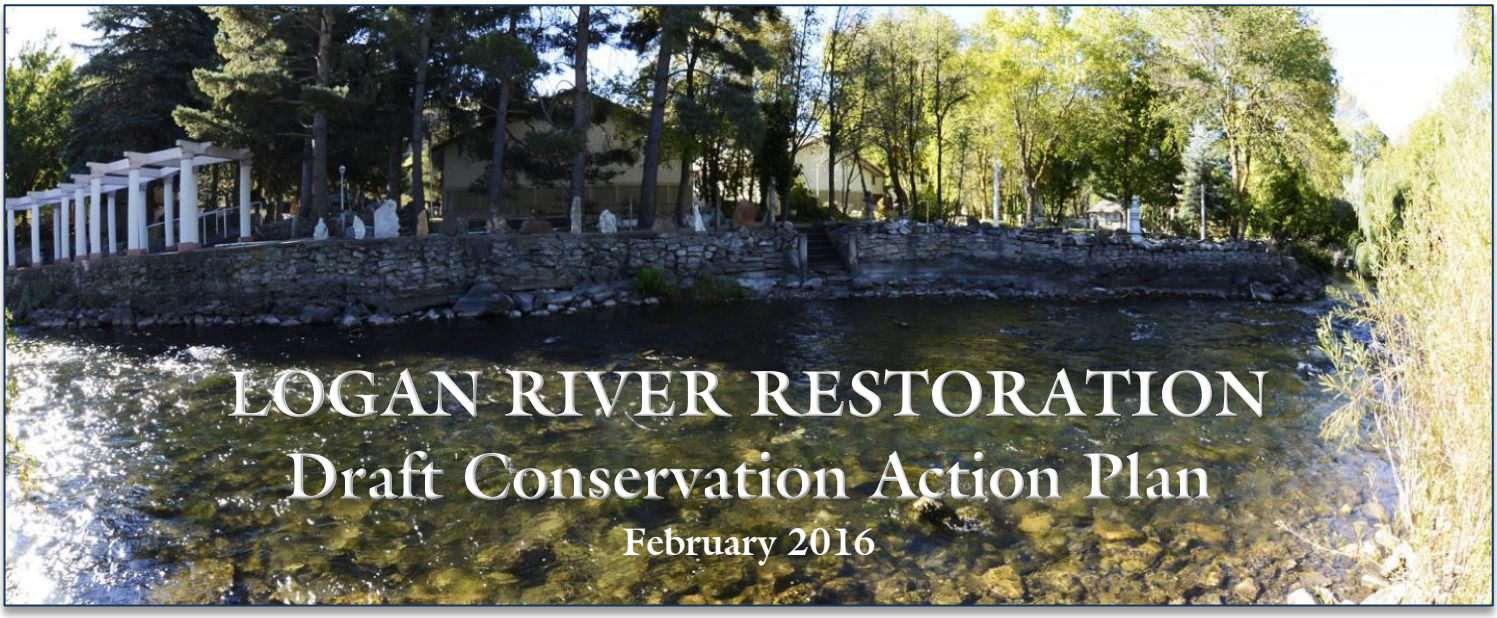
2-2016

Logan River Restoration Draft Conservation Action Plan

Logan River Task Force



LOGAN RIVER RESTORATION
Draft Conservation Action Plan
February 2016

The Logan River, an integral part of the greater Bear River ecosystem, originates within the Bear River Mountains in the headwaters of Logan Canyon and terminates at its confluence with the Little Bear River in Cutler Reservoir. The river is an asset to residents of Logan City and Cache County and has historically supported many beneficial uses. The Logan River was an important resource for Native Americans and pioneers, and it remains valuable today. Cache Valley citizens are attracted to the river and enjoy the aesthetics, recreational values, and wildlife resources associated with this high-quality river, which supports fish, wildlife, and many plant species unique to riparian and wetland habitats. The Logan River also provides water for irrigation, municipal water supply, and hydroelectricity.

To protect the Logan River from degradation and the growing threats of floodplain development, a Conservation Action Plan (CAP) has been drafted for the portions of the Logan River from First Dam (at the mouth of Logan Canyon) through Cache Valley to the confluence with the Little Bear River at Cutler Reservoir (Figure 1). The development of a short- and long-range vision for the river is needed to coordinate and prioritize conservation efforts and ensure a sustainable river system for future generations. This document summarizes the status of the Logan River CAP to enable the public to review and contribute feedback on the draft version. To date, stakeholder groups representing residential, commercial, recreational, and agricultural interests have participated in the development of this CAP, but additional input from the public is desired. The CAP is a dynamic set of objectives that can be revised as needed when new threats or conservation solutions are identified. The entire Logan River CAP spreadsheet can be found on the Logan City website (http://www.loganutah.org).

The Logan River CAP used The Nature Conservancy's science-based planning framework (further described at https://www.conservationgateway.org/Files/Pages/action-planning-cap-handb.aspx) to create a system-wide assessment and plan for the river. The CAP's purpose is to address the most important conservation, protection, and restoration priorities for the Logan River.

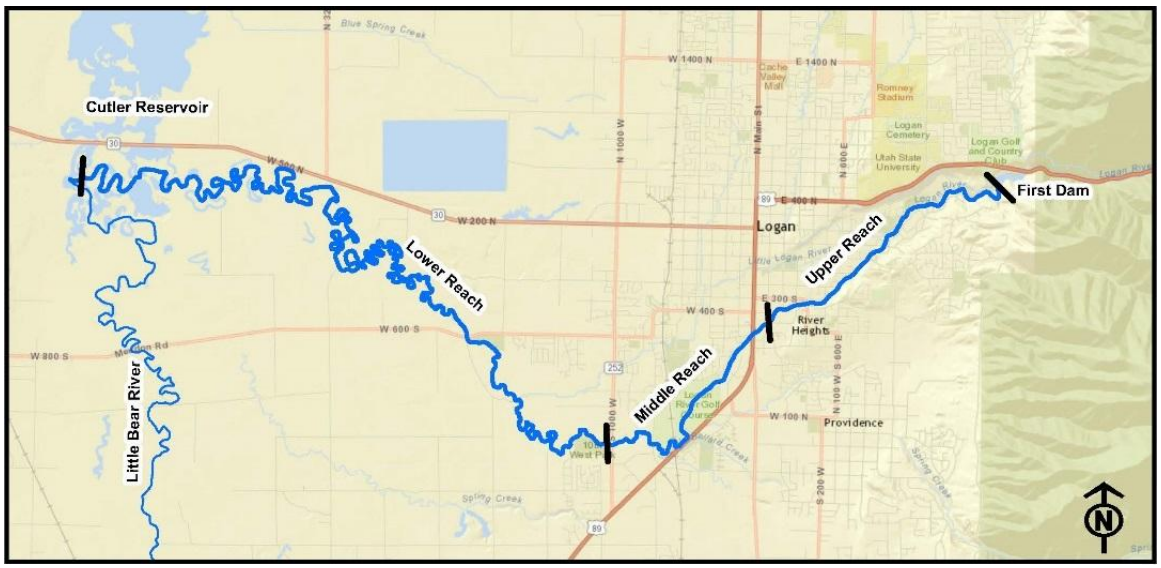


Figure 1. Logan River Restoration Conservation Action Plan (CAP) study area.

Planning Process and Methods

The CAP approach was adapted for the Logan River to include recreational and public values as well as ecological indicators of river health. To that end, the Task Force used a broad range of river health indicators and public uses to develop the draft CAP. The CAP addresses property protection associated with flooding and various recreational activities. It incorporates traditional values such as irrigation, concerns associated with channel erosion and flooding, and ecological conservation. If adopted by Logan City, the CAP will become the foundation for prioritizing river restoration projects, and it will provide evaluation criteria for monitoring long-term success of the various implemented conservation practices.

River Reaches

For planning purposes the Logan River was delineated into three reaches, as described below.

Upper Reach – First Dam to 100 East is dominated by residential development and associated land uses. The total length of the Upper Reach is 3.0 miles, and the reach is relatively high gradient (channel slope ranging from 1.00 to 0.75 percent), straight, and confined.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Middle Reach – 100 East to 1000 West is dominated by commercial and recreational development and associated land uses. The total length of the Middle Reach is 2.5 miles, the reach transitions from relatively high to moderately gradient (channel slope transitioning from 0.75 to 0.25 percent), and it becomes meandering and unconfined.


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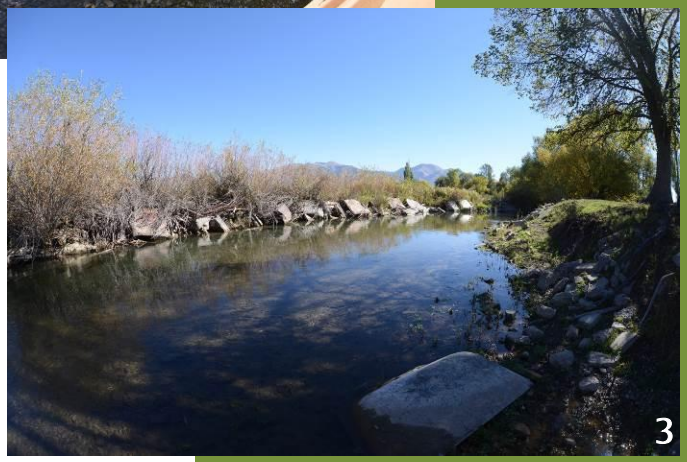
Sand and gravel sediments erode from the bed and banks in the Upper Reach and are transported during floods to the lower Middle Reach where they drop out of transport, creating large gravel bars and a meandering channel in this reach. Woody debris accumulation is very high in the channel, and consequently the potential for large branches to clog the river at bridges and other river constrictions is also very high in this reach. Much of the woody debris comes from crack willow, an invasive, nonnative tree that has overtaken the more desirable diverse native riparian vegetation that should exist here. Many native trees, shrubs, and grasses that protect streambanks cannot survive in the shaded understory of crack willow.

Lower Reach – 1000 West to the confluence with the Little Bear River in Cutler Reservoir is dominated by agricultural development and associated land uses. The total length of the Lower Reach is 14.5 miles, and it is relatively low-gradient (channel slope less than 0.25 percent), meandering, and unconfined.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Logan River Task Force Background

In 2014 a group of Utah State University professors, state and local government officials, and interest group representatives organized the Logan River Task Force (Task Force) to develop a method for improving areas along the Logan River.

The Task Force and Logan City are working with BIO-WEST, a local environmental consulting firm, to develop and implement the CAP and design restoration concepts for the river. More Task Force information can be found on page 8.

Existing and Desired Condition Indicators

The CAP identifies existing and desired conditions for each indicator (e.g., water quality), identifies threats to the conditions, and provides strategic actions to overcome the threats. Many indicators and strategic actions apply to the entire river, but the CAP separates existing and desired conditions for specific reaches where it was appropriate to do so. Existing and desired conditions for each indicator are rated on the color-coded, four-point scale below.

Poor	Fair	Good	Very Good

Results

The full CAP spreadsheet can be found on the Logan City website (http://www.loganutah.org). Table 1 on the following page summarizes indicators, conditions as assessed by the Task Force, and recommended strategic actions.

Indicators currently considered to be in **poor** condition include summer base flows (low flows during the hot summer months), floodplain functions, trout density, and riparian vegetation.

Strategic Action Example

Summer base flows, for example, are critical for maintaining good water quality, healthy fish populations, and a functional aquatic ecosystem, as well as aesthetics and preventing vegetation encroachment into the streambed. Summer base flows are currently considered **very good** above Crockett Diversion but **poor** from Crockett Diversion to Cutler Reservoir. The following strategic actions have been identified to improve summer base flows from **poor** (less than 10 cubic feet per second) to good (greater than 30 cubic feet per second):

- Help secure and manage instream flows recognizing existing water rights.
- Participate with governmental and nongovernmental organizations that can find and manage water for instream flows.
- Evaluate instream flow initiatives and potentially support the formation of a water conservancy district.

Table 1. A summary list of Logan River CAP indicators, existing conditions, and examples of strategic actions.

INDICATOR	RATIONALE	EXAMPLES OF STRATEGIC ACTIONS TO ACHIEVE OR MAINTAIN DESIRED CONDITION	CURRENT CONDITION	DESIRED CONDITION
Spring Peak Flow	A natural flow regime is important for maintaining channel capacity and habitat conditions.	• Evaluate projects (dams) that might adversely alter flow patterns. • Evaluate cumulative effects of any future water-development projects with respect to climate change.	Good	Good
Summer Base Flow	Summer flows are critical for maintaining good water quality and a functional aquatic ecosystem.	• Help secure and manage instream flows while recognizing existing water rights. • Participate with governmental and nongovernmental organizations that can find and manage water for instream flows. • Evaluate the instream flow initiatives and potentially support the formation of a water conservancy district.	Poor	Good
Flood Conveyance	Maintain the river channel's ability to convey flood waters reduces the flood risk to private and public property.	• Widen the floodplain where feasible. • Reduce or eliminate backwater and flooding impacts caused by Crockett Diversion • Design pressure-relief points for sediment accumulation. • Identify and address over accumulation of debris.	Fair	Good
Floodplain Functions	Functioning floodplains provide a variety of services including flood control, water quality and filtration, and wildlife habitat.	• Remove/pull back levees and restore banks wherever possible. • Provide homeowners and agricultural operators with guidance (best management practices). • Improve compliance with state stream alteration permitting. • Improve compliance with existing city floodplain and riparian ordinances. • Consider ordinance additions, easements, and acquisition.	Poor	Good
Water Quality	Clean water is aesthetically pleasing and critical for all aquatic species living in the river.	• Secure and manage instream flows. • Promote native vegetation planting. • Prevent damaging sediment releases.	Good	Very Good
Trout Density and Size	High catch rates and large fish size are important for quality fishing experiences.	• Increase diversity of instream habitat. • Ensure that water quality and quantity are sufficient for fish and food base survival. • Obtain Blue Ribbon Fishery designation.	Poor	Very Good
Bird Species Richness and Diversity	Birds are an important aesthetic component of the Logan River and indicator of ecosystem health.	• Restore multilayered vegetation. • Improve instream habitat. • Conserve nesting/foraging features. • Initiate monitoring program.	Fair	Very Good
Riparian Vegetation	Natural riparian vegetation provides important riverine functions.	• Promote native vegetation planting. • Control noxious weeds.	Poor	Good
Frogs, Salamanders, and Snakes	Amphibians and reptiles are an important aesthetic component of the Logan River and an indicator of ecosystem health.	• Restore riparian habitat including wetlands. • Improve habitat (fishless ponds, native vegetation). • Monitor/prevent invasive species (bullfrogs).	Poor	Very Good
Recreation Access	The Logan River is a public amenity and should have facilities that enable appropriate access and use.	• Connect/expand trails and parks. • Easement/acquisition. • Designated public river access locations. • Address barriers to trail connectivity, such as Main Street.	Fair	Very Good
Private Property Recreation Impacts	Public impacts on private properties should be addressed and prevented.	• Designate river access locations. • Provide trash collection, signage. • Expand walk-in access program. • Provide access map and appropriate river etiquette information.	Fair	Very Good
Private Property River Restoration Impacts	Project-related changes to flood conveyance and the riparian corridor could have anticipated or unanticipated impacts on adjacent private properties.	• Facilitate early public involvement in river restoration projects. • Implement well-designed river restoration projects based on the CAP. • Conduct follow-up public involvement to evaluate project success, identify issues that warrant resolution, and improve future projects.	Fair	Very Good


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Logan River Task Force Vision

Make the Logan River system a showcase of ecologically viable, socially beneficial river restoration.

Indicators currently considered to be in **poor** to **fair** condition include flood conveyance, bird diversity and abundance, recreational access, and private property impacts from recreation and restoration activities. Recent channel alterations conducted by Logan City and Cache County throughout the Logan River and Blacksmith Fork addressed various bed- and bank-erosion issues and had a net effect of improving flood conveyance from **poor** to **fair** at several locations in the Upper and Middle Reaches.

Issues, Concerns, and Threats Example

The following flood-conveyance issues, concerns, and threats are identified in the Logan River CAP for the Upper Reach:

- encroachment of the floodway by development and channel alterations,
- encroachment of public property by development and channel alterations,
- lack of connection between the river and its floodplains,
- lack of space for channel migration when accumulations of sand/gravel occur,
- backwater and flooding impacts caused by Crockett Diversion, and
- materials used for bank stabilization (e.g., concrete, boulders) fail and accumulate in channel.

Each threat identified in the CAP is of concern. For example, the combination of floodway encroachments, unregulated channel alterations, development encroachments onto public properties, and backwater and flooding impacts resulting from Crockett Diversion cause many homes and Riverside Elementary to be more susceptible to flooding. Addressing the issues and threats in this area will enhance public safety and result in better flood protection for up to 40 homes that are currently within the Federal Emergency Management Agency's 100-year floodplain designation in the vicinity of Crockett Diversion to the 100 North bridge. Many other opportunities exist to restore the Logan River's flood-conveyance capacities, as well as other indicators that are currently rated as **poor** or **fair**.


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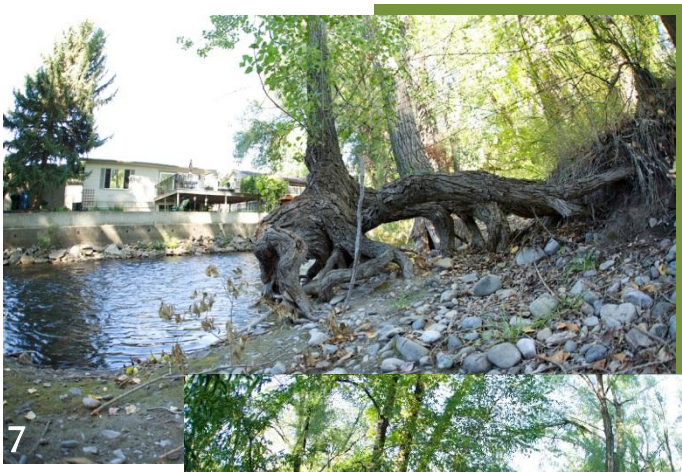
Some indicators are rated as good. Water quality, for example, is considered in good condition throughout the Upper and Middle Reaches, but it degrades into fair condition in the Lower Reach, especially in portions of the reach affected by Cutler Reservoir. Clean water is aesthetically pleasing and critical for all aquatic species living in the river, as well as those terrestrial species like birds and bats that forage on aquatic species. One objective of the Logan River CAP is to maintain high water quality year-round by reducing the threats posed by lower summer base flows, sediment releases from First Dam, and the loss and fragmentation of native, multilayered riparian vegetation.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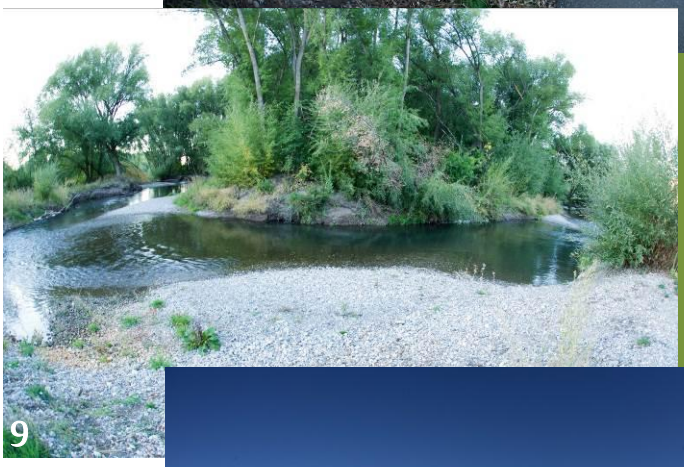
Improvements through Strategic Actions

The good news is that many of the indicators of river health and desired conditions are interrelated, so improvement in one area will help improve other areas. For example, riparian vegetation improvements will not only support more diverse bird species but also provide better water quality and fish habitat, as well as help prevent noxious weed invasions.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More good news is that actions can be taken by individual landowners, not just the City, to improve the Logan River. These incremental actions will make a big difference if they are conducted in a manner that minimizes downstream or cross-river effects and enhances instream and riparian habitats. For instance, Utah State University Forestry Extension's planting guide, *Taking Care of Streams and Rivers in Cache Valley*, provides a list of suggested plants—such as golden current, water birch, and redosier dogwood (to name a few) —that can help property owners protect streambanks and improve the riparian habitat on their lands. Printed copies of the riparian planting guide will be available at the public meetings and planting workshops.


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The Task Force helped Logan City obtain a state grant to be used for restoration work on the Logan River. This project will be designed during spring and summer, and construction will begin in fall 2016. The Task Force wants the work conducted under this grant to be a river restoration showcase that will inspire subsequent Logan River improvements. A second public meeting will be held on April 21, 2016, to introduce preliminary restoration concepts to the public for review and feedback.

Agriculture is an important land use along the Middle and Lower Reaches of the Logan River.

All Logan River reaches are used by boaters and anglers.

Great horned owls are among the bird species that inhabit the Logan River's riparian corridor.

Photo Information

Front page: Residential development impacting the banks, floodplain, and riparian area of the Upper Reach.

Photo 1. Eroding side hills and streambanks are common in the Upper Reach and a source of downstream sediment deposition.

Photo 2. Large deposits of sand and gravel transported from the Upper Reach impact flood conveyance in the Middle Reach.

Photo 3. Old cars and concrete scraps are common forms of failing bank-protection practices in the Lower Reach.

Photo 4. Native Bonneville cutthroat trout (image courtesy of the USDA Forest Service http://www.fs.usda.gov/detail/htnf/learning/nature-science/?cid=fsm9_026891).

Photo 5. Old, disposed automobiles ("Detroit riprap") from several decades ago present a major safety hazard to people using the river in the Lower Reach.

Photo 6. Wetlands and backwaters in the Middle and Lower Reaches provide habitat for waterbirds and shorebirds such as the American avocet.

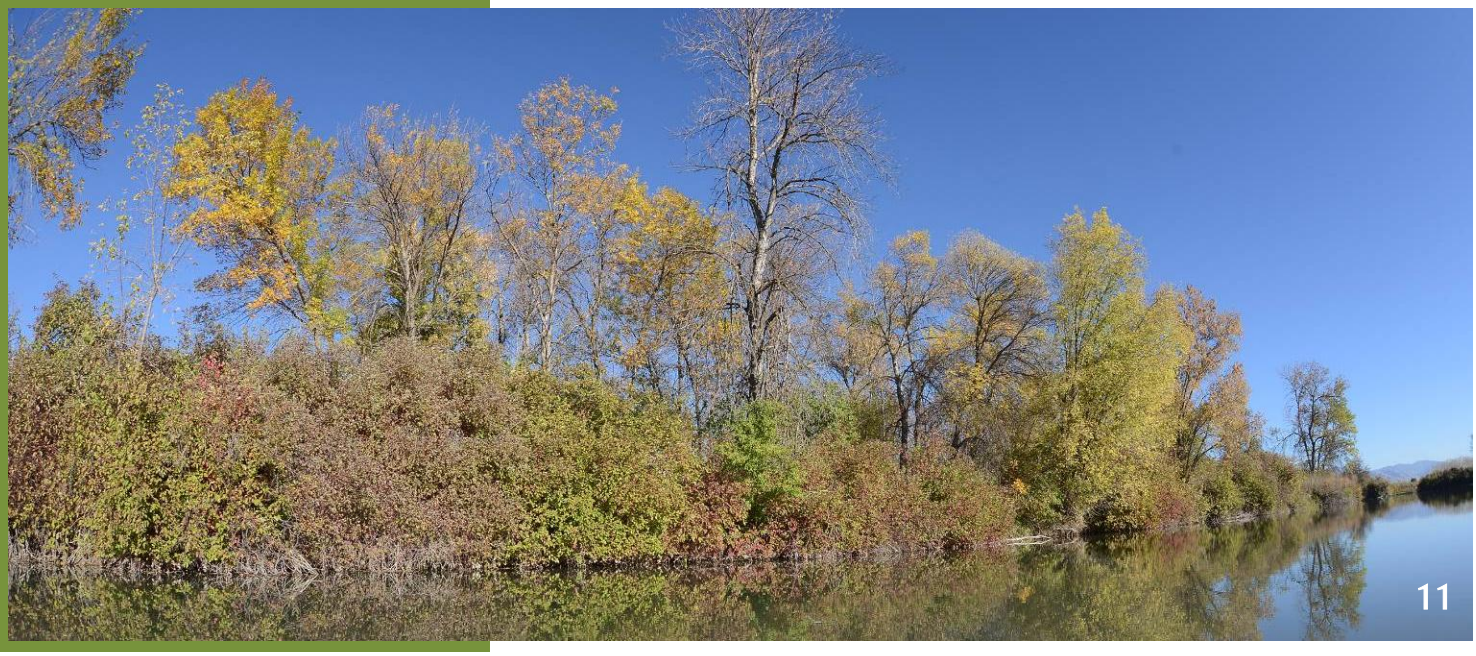
Photo 7. Residential development in the Upper Reach resulting in cross-channel bank erosion.

Photo 8 The Logan River Trail in the Middle Reach. The berm left of the trail, created in the mid-1980s, is composed of dredged sand and gravel piles created after the 1983–1984 floods. Major channel changes occurred during these floods.

Photo 9. Large gravel bars near Rendezvous Park formed during the 2011 floods. Gravel deposition at the railroad crossing, Park Avenue Bridge, and 1000 West are major flood concerns.

Photo 10. Eroding streambank in the Lower Reach. Streambanks that have been cleared of riparian vegetation are susceptible to erosion and create downstream water-quality problems.

Photo 11. Some riparian areas on the Lower Reach have multilayered, native riparian vegetation along the streambank and across the floodplain. Protecting the vegetation in these areas and restoring native species in degraded areas would improve floodplain function, water quality, aesthetics, and habitats for aquatic and avian species.



Logan River Task Force Participants

Member	Affiliation	Expertise/Title
Akina, Russ	Logan City	parks and recreation director
Artz, Neal	Cache Anglers	natural resources management and rural sociology
Allred, Mike	Utah Division of Water Quality	environmental scientist
Davies, Eve	PacifiCorp	environmental scientist
DeRito, Jim	Trout Unlimited	fisheries restoration
Dettenmaier, Megan	USU	forestry extension
Fotheringham, Bob	Cache County	irrigation districts
Hardman, Jon	Natural Resource Conservation Service	district conservationist
Hawkins, Chuck	USU	stream ecology and assessment
Henderson, Bracken	Utah Association of Conservation Districts	zone 1 coordinator
Horsburgh, Jeff	USU-Utah Water Research Lab	engineer
Houser, Lance	Logan City	assistant engineering
Howe, Frank	Bridgerland Audubon	avian ecology
McKee, Mac	USU-Utah Water Research Lab	engineer
Messner, Nancy	USU	water quality and watershed management
Nielsen, Mark	Logan City	public works director
Roper, Brett	USU	stream and fish ecology
Runharr, Josh	Cache County	development services director
Sorenson, Kent	Utah Division of Wildlife Resources	habitat biologist
Thompson, Paul	Utah Division of Wildlife Resources	aquatic program manager
Toth, Dick	USU	bioregional planning and watershed resources management
Warren-Kretzschmar, Barty	USU	bioregional planning and urban spaces
Wheaton, Joe	USU	fluvial geomorphology and river restoration
Wilcock, Peter	USU	river sedimentation and stream restoration
Advisors	**Affiliation**	**Expertise/Title**
Booton, Beth	Citizen	recreationist
Daugs, Nathan	Utah Association of Conservation Districts	planner
de Giorgio, Joan	The Nature Conservancy	conservation planning
Norman, Nate	Cache Valley Wildlife Association	river restoration revegetation

Key Logan River Task Force Contacts

Frank Howe, Bridgerland Audubon: frankhowe@utah.gov
Darren Olsen, BIO-WEST: dolsen@bio-west.com

How To Comment

Are your ideas and concerns addressed in the action plan? Do you have suggestions for other actions or indicators? What specific concerns do you have about the river?

Your comments will help the Task Force finalize the action plan and then develop design elements for specific projects.

Written comments will be accepted at the public meeting, or may be sent to the BIO-WEST public involvement coordinator by email or print mail: Sean Keenan, skeenan@BIO-WEST.com, BIO-WEST, Inc. 1063 West 1400 North, Logan, UT 84321. 435-752-4202.

What's Next?

- **The next public meeting is planned for April 21 (location to be determined), after strategies and preliminary design concepts have been developed by the BIO-WEST design team.**
- **The Task Force and USU Forestry Extension are offering a riparian planting workshop/volunteer opportunity, scheduled for Saturday, April 23, 2016. Visit www.forestry.usu.edu for details.**
- **Other future Task Force activities include developing monitoring projects and seeking funding for additional restoration projects.**